



## APPLICATION INFORMATION

# New Design Options in Window Frame Construction

Openair-Plasma® surface treatment for advanced adhesion

For a secure sustainable adhesion of sealants and adhesives on glass, plastics and metals a good pretreatment is absolutely necessary. The Openair-Plasma® gives a consistent on-line procedure for surface cleaning and activation at highest level.

### Profile wrapping

Openair-Plasma® treatment for new profile design and material combinations. The adhesion between window profile and foil has to meet the RAL-GZ 716 certification. Plastic compounds such as wood plastic composites (WPC) and coated metals needs in most cases surface treatment for secure bonding.

The Openair-Plasma® technology can be adjusted exactly to the profile giving a consistent surface treatment even on difficult geometries.

- Pretreatment with rotating plasma jets can cover wide surfaces at high speeds
- Integrated in fully automated production line
- Homogeneity of treatment by means of rotating jets even on very sensitive surfaces without damages
- Openair-Plasma® being particularly suitable for activating the surface of non-polar and recycled materials in an economical and procedurally safe manner at a high level

### Adhesion of thermal isolation

Thermal elements to avoid thermal bridges typically have a complex geometry as well as the profiles. The Openair®-Plasma nozzle can be positioned flexibly to the surface geometry. With the help of different kinds of nozzle heads, it is possible to reach even into slots - to treat full areas or do a selective treatment.

- 100% plasma monitoring resulting in a safe procedure
- A wide range nozzle heads are available for exact profile adaption
- High surface activation for advanced adhesion
- Useable for a wide variety of materials

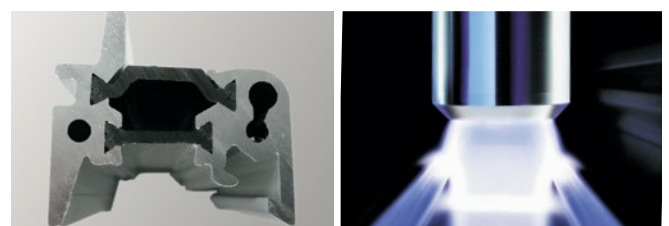
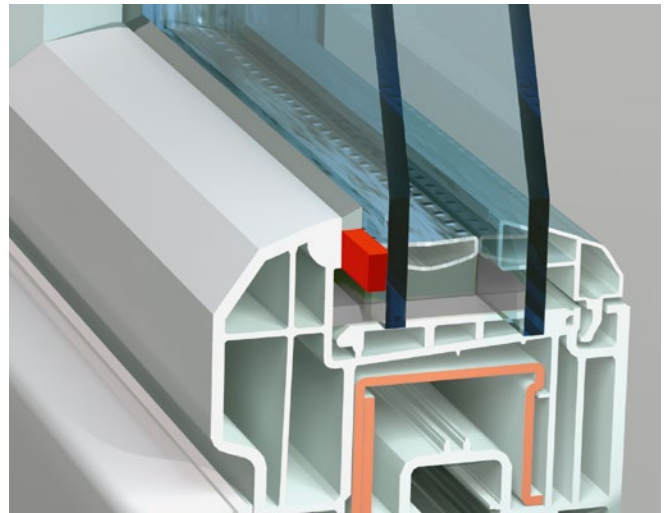


Fig. left: Thermal element with complex geometry  
Fig. right: Full area surface treatment on profiles

## Direct Glazing

The glass pane has become an integral part of the window thus increasing the stability and stiffness of the whole window. It enables better frame stability, better burglar resistance, smaller frames for more daylight and better thermal insulation properties. The automation of the manufacturing process guarantees enhanced and constant quality of the bonded window and allows increased productivity.

- Reducing material costs
- Improved thermal insulation
- Reduction of production costs
- Pre-treatment immediately prior to final assembly
- The highest possible precision in mass production
- No damage of the visible surface area



Example of direct glazing

## Openair-Plasma® cleaning and coating of aluminum shutters and frames

The Openair-Plasma® technology can be used to treat different kinds of material, for example aluminum. The pictures show the difference of painted shutters with/without plasma treatment (Source: Samples done by Co. Griesser, Mr. Vasiljevic).

- Openair-Plasma® fine cleaning before painting
- Replacement of wet chemicals and is an environmentally friendly process



Left: Conventional pretreatment:  
result after 1000 hours of salt spray test, Conversion layer 80 mg<sup>2</sup>

Right: Openair-Plasma® cleaning and chrome 6-free layer:  
result after 1500 hours of salt spray test, Conversion layer 20 mg<sup>2</sup>

## Economical and environmentally friendly

The application of Openair-Plasma® helps to protect the environment effectively. Surfaces through physically pretreatment are cleaned and activated, removing any requirement of a VOC or water-based primer. This is very economical as existing equipment can be modified and made more productive. In addition, running costs for adhesion promoters and the associated equipment for application and drying can be saved.

Surface treatment using Openair-Plasma® avoids chlorinated hydrocarbons, which are often used as solvents, cleaners and degreasers. These represent a major environmental problem, some of them end up in the air or water and contribute to the destruction of the ozone layer. Introducing Openair-Plasma® reduces VOC emissions considerably. Plasma activation is a method of functionalizing a surface. It is done with the intent to alter or improve adhesion properties of surfaces prior to coating, painting, etc. In most cases, the surface in question is a surface of a polymer material and weakly ionized atmospheric pressure plasma is used. But it can also be used on other substrates such as aluminum or WPC.

## Implementation

Use of the Openair-Plasma® technique is always associated with the movement between jet and substrate. In profile wrapping machines, extruder lines or any other laminating line, the precise jet positioning provides the optimal treatment distance. With direct glazing using XYZ tables or robots the complete frame of the window construction can be scanned and treated.

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AIDE199\_2022\_03\_03 Window frame construction  
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